REMARKS

Claims 1-8 and 11-23 are pending. Claims 5, 14, and 22 have been cancelled herein.

Claims 6, 15 and 23 have been amended herein and, as amended, are fully supported in the detailed description. No new matter has been added to the specification.

35 U.S.C. §132

Applicant's amendment filed 29 January 2003 has been objected to under 35 U.S.C. §132 as introducing new matter. Examiner states that the added material which is not supported by the original disclosure is the limitation that the "voltage pull-up device is implemented as a transistor with less than 1.0 V_{BE}."

Examiner states that "there is no ' pull-up device' found to be disclosed that is a 'transistor'," and that the "only element found to be disclosed that is a 'pull-up device' that meets the claim limitations is element 214, 314." Further, it is stated that the "only disclosure of a transistor having 'less that 1.0 V_{BE}' is for transistor 209, which is the 'buffer circuit', not the 'pull-up circuit'."

Applicant concurs that transistor 209 is part of a buffer circuit and not a pull-up device. However, in the original application as filed, the detailed description section, at line 21, page 13 through line 18, page 14, device 320 is disclosed "as a resistor or as a transistor with less than 1 V_{BE}" (Detailed Description, lines 1 & 2, page 14). Furthermore, device 320 and transistor 309 are fully disclosed as pulling up the V_{BE} of transistor 310. "The combination of device 320 and transistor 309 acts to pull the V_{BE} of transistor 310 towards V_{CC}" (Detailed Description, lines 11-13, page 14).

The function of device 320 as a pull-up device is fully disclosed in Applicant's application as originally filed. Furthermore, the claimed implementation of Device 320 as a "transistor with less than 1.0 V_{BE}" is also fully disclosed. Therefore, Examiner's objection to Applicant's application under 35 U.S.C. §132 is respectfully traversed.

35 U.S.C. §112

Claims 1 – 8 and 11 - 23 have been rejected under 35 U.S.C. §112 as containing subject matter "which was not described in the Specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention."

Claims 5, 14, and 22 have been cancelled herein.

Claims 1 – 4, 7, 8, 11 – 13 and 16 – 21 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctively claim the subject matter which applicant regards as the invention.

Examiner states that there is no support found in the original specification for the claimed "pull-up device is implemented as a transistor with less than 1.0 V_{BE}." Applicant respectfully directs Examiner's attention to Applicant's application, as originally filed. There, as discussed above, Applicant's Detailed Description states that the pull-up device, 320, is disclosed "as a resistor or as a transistor with less than 1 V_{BE}" (Detailed Description, lines 1 & 2, page 14. Furthermore, device 320 and transistor 309 are fully disclosed as pulling up the V_{BE} of transistor 310. "The combination of device 320 and transistor 309 acts to pull the V_{BE} of transistor 310 towards V_{CC}" (Detailed Description, lines 11-13, page 14). Therefore rejection of Claims 1 – 4, 7, 8, 11 – 13 and 16 – 21 under 35 U.S.C. §112 is respectfully traversed and Applicant submits that, as regards 35 U.S.C. §112, Claims 1 – 4, 7, 8, 11 – 13 and 16 – 21 are in condition for allowance.

35 U.S.C. §103

Claims 1 – 8 and 11 – 23 have been rejected under 35 U.S.C. §103 as being unpatentable over U.S. Patent 5,621,308 to Kadanka et al in view of newly cited U.S. Patent 5,517,143 to Gross.

Regarding Claims 1, 7 and 16, Kadanka et al discloses a current mirror implementation in the regulator portion of its circuit (col 1, lines 63-67, col 2, lines 1-3). As Examiner points out, in view of Gross, a current mirror will function at a wide range of Vbe. However, Applicant's claimed "voltage is a VBE of less than 1.0 V" is not in a current mirror portion of Applicant's

claimed invention but in the "voltage pull-up device." Applicant's claimed invention, therefore, distinguishes over the cited references and traverses obviousness rejections. Applicant respectfully submits that Claims 1, 7, and 16 are in condition for allowance.

Regarding Claims 6, 15 and 23, Kadanka et al discloses that a larger resistance results in a higher voltage to the base of a transistor which will raise the output voltage at a node connected to the transistor's emitter. (col 3, line 64-67). However, Kadanka's transistor is not the point of band-gap voltage measurement and is not analogous to Applicant's claimed "transistor with a VBE of less than 1.0 volts." Further, Kadanka's transistor above is not analogous to Applicant's claimed "voltage pull-up device." Claims 5, 15 and 23, therefore, traverse the rejections of record and, Applicant respectfully submits, are in condition for allowance.

Regarding Claims 2 – 4, 8, 11 – 13, and 17 – 21: these are dependent claims, dependent from allowable claims. As such, they are allowable limitations on those claims and the rejections of record are respectfully traversed.

CONCLUSION

In light of the foregoing amendments and remarks, Applicant respectfully submits that the remaining claims are in condition for allowance. Applicant respectfully requests reconsideration of the application and allowance of the pending Claims.

The Examiner is invited to contact Applicant's undersigned representative if the Examiner believes such action would expedite resolution of the present Application.

Respectfully submitted,
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COMPLETE CLAIM LISTING AS OF THIS AMENDMENT

1. (Previously Amended) A low impedance band-gap reference circuit, comprising:

a band-gap reference circuit;

a buffer circuit electronically coupled with said band-gap reference circuit; and

a voltage pull-up device electronically coupled with said band-gap reference circuit and said buffer circuit, wherein said voltage pull-up device acts to reduce a required supply voltage to maintain a band-gap reference voltage and wherein said voltage pull-up device is implemented as a transistor with less than 1.0 VBE.

2. A band-gap reference circuit as described in Claim 1, wherein said band-gap reference circuit resides in an integrated circuit device.

3. A band-gap reference circuit as described in Claim 1, wherein said band-gap reference circuit is implemented in a silicon substrate.

4. A band-gap reference circuit as described in Claim 1, wherein said buffer circuit is implemented as a transistor.

5. (Cancelled) A band-gap reference circuit as described in Claim 1, wherein said voltage pull-up device is a resistor.

6. (Amended) A band-gap reference circuit as described in Claim 1, wherein said band gap reference voltage is provided by current through a transistor with a VBE of less than 1.0 volts.

7. (Previously Amended) An electronic device, comprising:

a silicon substrate;

electronic circuitry constructed in said silicon substrate; and

a band-gap reference circuit electronically coupled in said electronic device, wherein said electronic circuitry requires reference to the output voltage of said band-gap reference circuit and said band-gap reference circuit is enabled for low impedance by a buffer circuit comprising a transistor with less than 1.0 VBE.

8. An electronic device as described in Claim 7, wherein said electronic device is an integrated circuit device.

9. (Previously Cancelled) An electronic device as described in Claim 7, wherein said band-gap reference circuit is enabled for low impedance by a buffer circuit.

10. (Previously Cancelled) An electronic device as described in Claim 9, wherein said buffer circuit is implemented as a transistor circuit.

11. (Previously Amended) An electronic device as described in Claim 7, wherein said transistor with less than 1.0 VBE is connected as an emitter follower.

12. An electronic device as described in Claim 7, wherein said band-gap reference circuit is enabled for low supply voltage.

13. An electronic device as described in Claim 12, wherein said band-gap reference circuit is enabled for said low supply voltage by a voltage pull-up device.

14. (Cancelled) An electronic device as described in Claim 13, wherein said voltage pull-up device is a resistor.

15. (Amended) An electronic device as described in Claim 13, wherein said band gap reference voltage is provided by current through a transistor with a VBE of less than 1.0 volts.

16. (Previously Amended) In an electronic device, a method for providing a reference voltage, comprising:

flowing current through an electronic element such that the band-gap voltage of said electronic element provides said reference voltage;

providing a buffer circuit enabled to provide low impedance; and

adjusting the voltage across said buffer circuit so that said band-gap reference voltage is maintained, wherein said voltage is a VBE of less than 1.0 V.

17. A method as described in Claim 16, wherein said electronic device is an integrated circuit device.

18. A method as described in Claim 16, wherein said buffer circuit is implemented as a transistor circuit.

19. A method as described in Claim 18, wherein said transistor circuit is connected as an emitter follower.

20. A method as described in Claim 16, wherein said band-gap reference circuit is enabled for low supply voltage.

21. A method as described in Claim 20, wherein said band-gap reference circuit is enabled for said low supply voltage by a voltage pull-up device.

22. (Cancelled) A method as described in Claim 21, wherein said voltage pull-up device is a resistor.

23. (Amended) A method as described in Claim 21, wherein said band gap reference voltage is provided by current through a transistor with a VBE of less than 1.0 volts.